WHAT IS CLAIMED IS:

1.   A waterpouring system for use with a multiple-input, multiple-output (MIMO) transmitter, comprising:

an encoding decision subsystem configured to select a constellation combination based on gains in channels of said MIMO transmitter;

a vector modulator subsystem, coupled to said encoding decision subsystem, configured to modulate a fixed number of bits in a bitstream with said constellation combination to generate a symbol vector; and

a normalization and precoding subsystem, coupled to said vector modulator subsystem, configured to weight said symbol vector based on said gains to yield a weighted symbol vector and distribute said weighted symbol vector among said channels.

2.   The waterpouring system as recited in Claim 1 wherein said encoding decision subsystem is configured to select said constellation combination from a set of constellation combinations constituted from at least one modulation technique selected from the group consisting of:

quadrature amplitude modulation, and

phase shift keying.

3. The waterpouring system as recited in Claim 1 wherein
2 said gains are configured to be reflected in an ordered, real
3 diagonal matrix.

4. The waterpouring system as recited in Claim 1 wherein
2 said encoding decision subsystem is configured to select a maximum-
3 rate subchannel constellation and a corresponding gain that encodes
4 a number of bits based on a transmission capacity.

5. The waterpouring system as recited in Claim 1 wherein
2 said weighted symbol vector is configured to have an energy
3 equaling a total transmit energy of said MIMO transmitter.

6. The waterpouring system as recited in Claim 1 wherein
2 said normalization and precoding subsystem is configured to
3 distribute said weighted symbol vector along an orthogonal right
4 singular vector of a matrix representing said channels.

7.   The waterpouring system as recited in Claim 1 wherein said MIMO transmitter is configured to form a part of a selected one of:

a narrowband wireless communication system employing multiple antennas,

a broadband communication system employing orthogonal frequency division multiplexing,

a time division multiple access communication system, and

a multiuser communication system.

8.   A waterpouring method for a multiple-input, multiple-output (MIMO) transmitter, comprising:

selecting a constellation combination based on gains in channels of said MIMO transmitter;

modulating a fixed number of bits in a bitstream with said constellation combination to generate a symbol vector;

weighting said symbol vector based on said gains to yield a weighted symbol vector, and

distributing said weighted symbol vector among said channels.

9.   The method as recited in Claim 8 wherein said selecting comprises selecting said constellation combination from a set of constellation combinations constituted from at least one modulation technique selected from the group consisting of:

quadrature amplitude modulation, and

phase shift keying.

10.   The method as recited in Claim 8 wherein said gains are reflected in an ordered, real diagonal matrix.

11.   The method as recited in Claim 8 wherein said selecting comprises selecting a maximum-rate subchannel constellation and a corresponding gain that encodes a number of bits based on a transmission capacity.

12. The method as recited in Claim 8 wherein said weighted
symbol vector has an energy equaling a total transmit energy of
said MIMO transmitter.

13. The method as recited in Claim 8 wherein said
distributing comprises distributing said weighted symbol vector
along an orthogonal right singular vector of a matrix representing
said channels.

14. The method as recited in Claim 8 wherein said MIMO
transmitter forms a part of a selected one of:
    a narrowband wireless communication system employing multiple
antennas,
    a broadband communication system employing orthogonal
frequency division multiplexing,
    a time division multiple access communication system, and
    a multiuser communication system.

15. A multiple-input, multiple-output (MIMO) transmitter
2 employing an input bitstream, comprising:

3   a plurality of transmit channels; and

4   a waterpouring system, including:

5   an encoding decision subsystem that selects a
6 constellation combination based on gains in said transmit
7 channels,

8   a vector modulator subsystem, coupled to said encoding
9   decision subsystem, that modulates a fixed number of bits
10   in said input bitstream with said constellation
11   combination to generate a symbol vector, and

12   a normalization and precoding subsystem, coupled to said
13   vector modulator subsystem, that weights said symbol vector
14   based on said gains to yield a weighted symbol vector and
15   distributes said weighted symbol vector among said transmit
16   channels.

16. The MIMO transmitter as recited in Claim 15 wherein said
2 encoding decision subsystem selects said constellation combination
3 from a set of constellation combinations constituted from at least
4 one modulation technique selected from the group consisting of:

5   quadrature amplitude modulation, and

6   phase shift keying.

17.   The MIMO transmitter as recited in Claim 15 wherein said
2   gains are reflected in an ordered, real diagonal matrix.

18.   The MIMO transmitter as recited in Claim 15 wherein said
2   encoding decision subsystem selects a maximum-rate subchannel
3   constellation and a corresponding gain that encodes a number of
4   bits based on a transmission capacity.

19.   The MIMO transmitter as recited in Claim 15 wherein said
2   weighted symbol vector has an energy equaling a total transmit
3   energy of said MIMO transmitter.

20.   The MIMO transmitter as recited in Claim 15 wherein said
2   normalization and precoding subsystem distributes said weighted
3   symbol vector along an orthogonal right singular vector of a matrix
4   representing said transmit channels.